

Figure S1: Particle characteristics of P90-BaP and AS-PAH used in the present study.

The images in (a) and (b) show the representative scanning electron microscopic images of PAH-depleted AS-PAH, (a) shows the scanning and (b) shows the transmission electron micrograph. The diagram in (c) displays the particle size distributions of AS-PAH without PAH. A representative thermogram of P90-BaP and AS-PAH is shown in diagram (d). The mass loss of P90-BaP is shown by red line and the mass loss of AS-PAH is shown by blue line. The image in (e) shows a representative GC/MS chromatogram of PAHs from an AS-PAH sample.

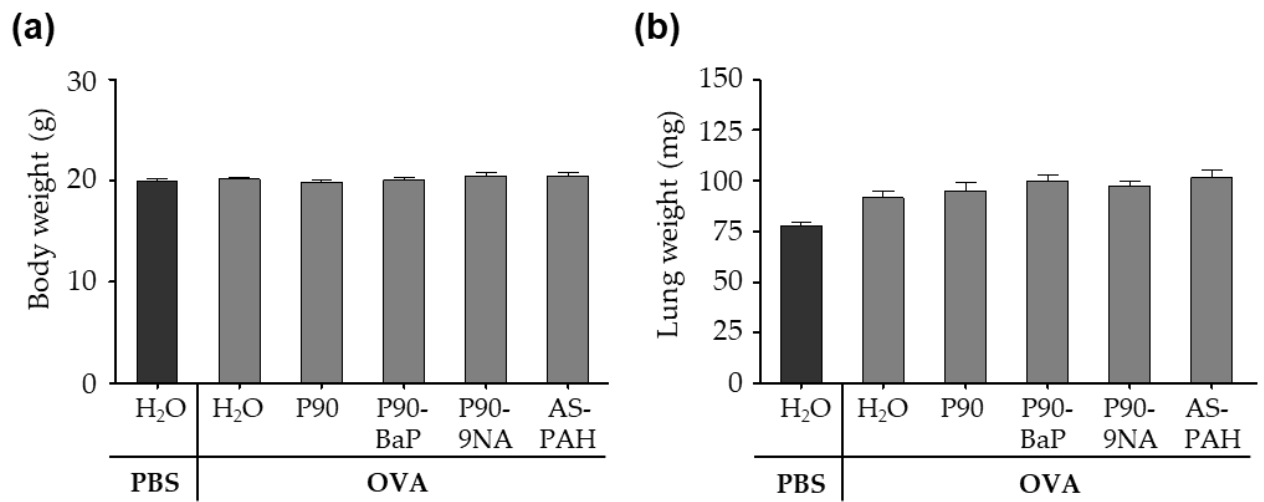
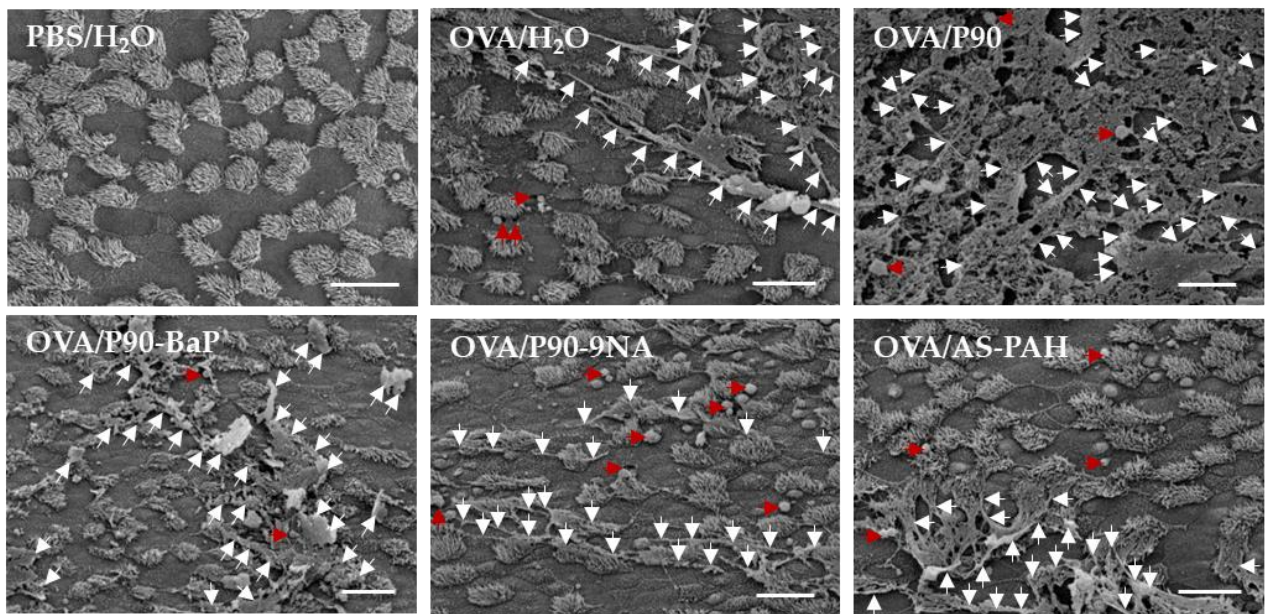


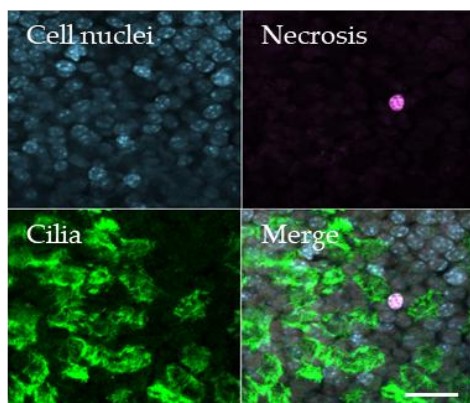
Figure S2: The CBNP exposure did not increase the wet weight of the lung in OVA-treated mice.

The diagrams show the final body weight (a) and the wet weight of the left lung (b) of mice. The results are presented as the mean \pm SEM. (n = 13–18), $p < 0.05$ was considered statistically significant using the Mann Whitney U test.

(a)



(b)



(c)

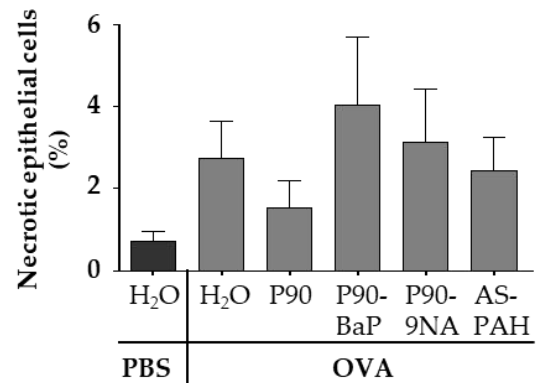


Figure S3: The CBNP did not increase the number of necrotic cells in the tracheal epithelium of OVA-treated mice.

The images in (a) show the tracheal epithelium after H₂O or CBNP exposure. The white arrows indicate mucus and the red arrows indicate dead cells on the the epithelium. (n = 3–4) The images in (b) show the stained tracheal epithelium, the cell nuclei are stained with Hoechst dye (blue), the necrotic cells are stained with Ethidium homodimer-1 (pink), and the cilia are labeled with a fluorescent-labeled anti-acetylated α -tubulin antibody. The quantification of necrotic cells is presented in (c) as a percentage of the total cell numbers. Mean \pm SEM. (n = 4–6).

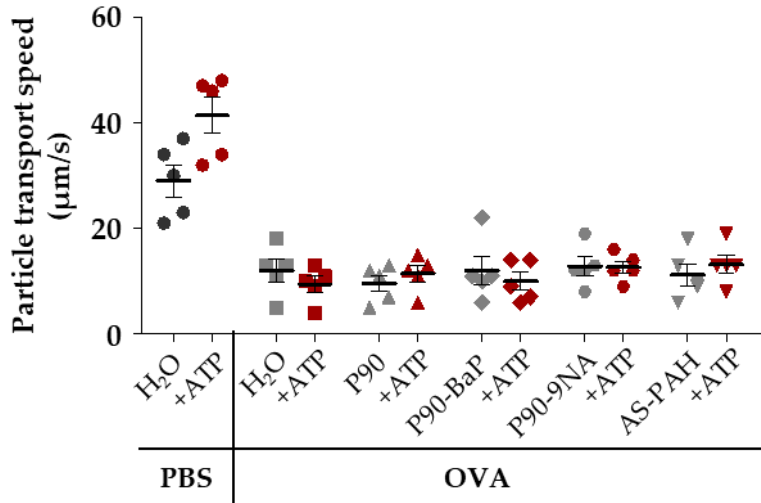


Figure S4: The ATP did not increase the particle transport speed on the tracheal epithelium of OVA- and CBNP-treated mice.

The diagram shows the mean particle transport speed after exposure to H₂O or CBNP (grey) and during the additional exposure to ATP (red). Each data point represents a single experiment. The lines with bars represent the mean \pm SEM.

Table S1: The identified surface-bound PAH species of AS-PAH.

Number	Compound	Retention Time (min)	Molecular Weight (g/mol)	Rings	Reference
1	Naphthalene	10.875	128	2	NIST
2	1-methyl-naphthalene	12.683	146	2	NIST
3	2-methyl-naphthalene	12.942	146	2	NIST
4	Biphenylene	14.275	152	3	NIST
5	Acenaphthylene	14.908	152	3	R
6	Fluorene	16.608	166	3	R
7	Phenanthrene	18.883	178	3	NIST
8	Anthracene	18.992	178	3	R
9	4H-cyclopenta[def]phenanthrene	20.333	190	3	NIST
10	Fluoranthene	21.742	202	3	R
11	Pyrene	22.258	202	4	R
12–14	Cyclopenta[cd]pyrene/ Benzo[ghi]fluoranthene	24.632– 25.435	226	5	NIST

The PAH were analyzed with GC/MS and identified by reference substances (R) or by the National Institute of Standards and Technology Database (NIST). The PAH compounds with numbers 12–14 are represented as isomers.

Table S2: The primer and probe sequences used for the quantitative PCR.

Target	NM Number	Sequence Primer Sense (5'-3')	Sequence Primer Antisense (5'-3')	Sequence TaqMan FAM-TAMRA (5'-3')	Used For
<i>Cyp1a1</i>	009992.4	TTCTGTCTCCGTTACCTG	CCTGTCTGACAATGCTCAA	CTTCCCTGGATGCCITCAAGGACTTGAATG	both*
<i>Cyp1b1</i>	009994.1	TTACGGACATCTTCGGAGCC	AACCTGGTCCAATCAGCC	CCTTTCACCCGGCTGCTGTGGCTG	tec
		AGGATGTGCTGCCACTATT	AGCTGGAGAATCGCATTGAT		ia
<i>Gpx3</i>	008161.3	CAGGCGAGAACTCGGAGATA	AGCGGATGTCATGGATCTTC	CAAGTATGTTCCGACCAGGTGGGGCTTTG	both*
<i>Gr</i>	010344.4	TCGGAATTCATGCACGATCAC	TGTTACGGCGGCTCACATAG	GGCTTCAAAGCTGTGAGGGTAAATTCAGTTGG	both*
<i>HO-1</i>	010442.2	AGAAGAGGCTAAGACCGCCT	CTCTGACGAAGTGACGCCAT	GTGTTCTCTGTCAGCATCACCTGCAGCTCC	both*
<i>IL-6</i>	031168.1	CTCCCAACAGACCTGTCTATAC	GTGCATCATCGTGTTCATAC	TGCCATGCACAACCTTTTCTCAATTCCACG	both*
<i>IL-13</i>	008355.3	GGAGCTTATTGAGGAGCTGAG	CAGGGAATCCAGGGCTACAC	CATCACACAAGACCAGACTCCCTGTGC	tec
		Quantitect-Qiagen QT00099554			
<i>IL-17A</i>	010552.3	TCAGACTACCTCAACCGTTC	CTTCCCTCCGCATTGACAC	CACCCTGGACTCTCCACCGCAATGAAG	tec
		TGTGAAGGTCAACCTCAAAGTCT	GAGGATATCTATCAGGGTCTTCAT		ia
<i>KC (Cxcl1)</i>	008176.3	CAGACCATGGCTGGGATTC	GAACCAAGGGAGCTTCAG	CCTCGGACCATTCTTGAGTGTGGCTATGAC	both*
<i>Mcp-1</i>	011333.3	TAGGCTGGAGACTACAAGAG	TCTGGACCCATTCCTTCTG	GCAGCAGGTGCCAAAGAAGCTGTAGTTTTTG	tec
		GGCTCAGCCAGATGCAGTTA	GCTGCTGGTATCCTCTTGT		ia
<i>Muc5ac</i>	010844.1	AGATCTCCGTGGTCTGGAA	GGTACAACCTTCCATTGACG	CCCATCTTTGATGAGGGCACAATGCAGTG	tec
		Quantitect-Qiagen QT01744575			
<i>Muc5b</i>	028801.2	CAGAACTGGAGCTGG	GGATATGGAGTCACTATACA	CCTCCGTGGCCTTGTCTATGGTGTG	tec
		GTGCCTTGTCTCAGTCCCTC	TCTGACTGTCTCCGGTGTG		ia
<i>Rpl32</i>	172086.2	AAAATTAAGCGAAACTGGCG	ATTGTGGACCAGGAACITGC	CATTGACAACAGGGTCCGGAGAAGGTTTC	both*

* Intrapulmonary airways and tracheal epithelial cells, tec = tracheal epithelial cells, ia = intrapulmonary airways.